



CURRICULUM VITAE

PERSONAL DATA:

Ole Isacson
14 Ellery Square
Cambridge, MA 02138

EDUCATION:

University career and degrees

1979 Biochemistry, University-College of Kalmar
1980 Medical School, University of Lund
1981 Research appointment, University of Lund, in the laboratory of Prof. A. Björklund
1983 1st medical degree, Medical Bachelor, Medical School, University of Lund
1987 Doctor of Medicine (Dr Med Sc), University of Lund (May 1987) on thesis: "Neural grafting in an animal model of Huntington's disease"
1987 Fellow in Neurobiology, University of Cambridge, England
1989 *Docent* (Academic Title of Assoc. Professor) of Medical Neurobiology, University of Lund
2002 Harvard University, Masters Degree (MA) conferred

UNIVERSITY POSITIONS AND APPOINTMENTS:

1981-83 Teaching Assistant, Dept. of Histology, University of Lund, Sweden
1983-85 Research Assistant (Demonstrator), University of Lund, Sweden
1986-87 Lecturer & Research Associate, Dept. of Medical Cell Research, University of Lund, Sweden
1987-89 Research Fellow, Neuroscience, Dept. of Anatomy, University of Cambridge, England
1989-92 Asst. Professor of Neuroscience (Neurology), Harvard Medical School and Massachusetts General Hospital, Boston, MA, U.S.A.
1989- Director of Neuroregeneration Laboratory, MRC, McLean Hospital
1992- Associate Professor of Neuroscience (Neurology), Harvard Medical School and Massachusetts General Hospital
1993- Associate Professor of Neuroscience, University of Massachusetts, Medical School
1999- Director, NINDS Center of Excellence for Research on Parkinson's Disease and Center for Neuroregeneration Research (McLean Hospital/Harvard Medical School)
2002 Professor of Neuroscience (Neurology), Harvard Medical School and Massachusetts General Hospital

Personal scholarships and grant awards

1976-78 Nathorst's Scientific Foundation. Scholarship Award at Atlantic College, Wales, G.B.
1983 The Medical Faculty Award for thesis work in medicine, University of Lund, Sweden
1987 The Fernstrom Foundation Scholarship Award 1987 for medical scientists
1987 The Swedish Physician's Society Award for studies on neurodegenerative diseases
1987 The Royal Swedish Academy of Sciences. Lindahl's Award
1987-88 European Neuroscience Association: Research Grant # 86/79
1987-89 Swedish Medical Research Council: Research Grant # K88-12P-08433
1989-90 NATO Grant, for studies on neurodegenerative disease. Research grant # CRG 890583
1990-91 NIH Program Project Award: Huntington's Disease Center, Massachusetts General Hospital and McLean Hospital.
1991-96 NIH: Neurological Science. Research Grant 1 R29 NS29178

1992- NIH: Neurological Science. Research Grant 1 RO1 NS30064
 Personal scholarships and grant awards (continued)

1990-95 Training Grant in Neuroscience, Massachusetts General Hospital (P.I. Dr. Richard Masland)
 1994- Training Grant in Molecular Biology of Neurodegeneration, Harvard Medical School (P.I. Dr. Jonathan Cohen)
 1994-2001 Training Grant in Clinical Neuroscience, McLean Hospital (P.I. Dr. Francine Benes)
 1994-95 Milton Fund Award, Harvard University
 1998- USAMRMC Research Grant, DAMD-98-1-8618
 1999-01 USAMRMC Research Grant DAMD-99-1-9482
 1999- NIH: NINDS, Parkinson's Disease Center of Excellence, 1 P50 NS39793
 1999-01 The Century Foundation Research Award
 1999- NIH RO1 Award: Neurological Science. Research Grant # RO1 NS30064-07
 2000- NIH RO1 Award: Neurological Science. Research Grant # RO1 NS41263-01
 2001- USAMRAA Research Grant Award DAMD17-01-1-0762 (R01 level)
 2001- The Kinetics Foundation Research Award
 2002- Parkinson Foundation of the National Capital Area Research Award
 2002 Bernard Sanberg Memorial Award for Brain Repair, American Society for Neural Transplantation and Repair

Teaching and administrative experience

1981-83 Seminars and tutorials in Cell Biology, Histology and Neurobiology at the Medical Faculty, University of Lund, Sweden
 1983-85 Lecturer in Neurobiology and Histology at the Medical Faculty, University of Lund.
 1985-87 Lecturer and Assistant Director of Medical Neurobiology Course, Lecturer in Histology, Supervisor for research students in Medicine, Co-supervisor for 2 PhD students, University of Lund.
 1987-89 V. Fellow, Jesus College, Cambridge, University of Cambridge, England.
 Supervisor for Medical Part II students, University of Cambridge, England.
 1989-92 Asst. Professor of Neurology, Program of Neuroscience, Harvard Medical School, Boston, MA
 1989- Director of Neuroregeneration Laboratory, HMS, MRC, McLean Hospital, Belmont, MA: (Currently 5 post-doctoral, 5 pre-doctoral fellows and 3 support staff, lab space 2100 sq. feet)
 Neurology Research (Neuroanatomy), Massachusetts General Hospital, Boston, MA
 Principal Investigator, Harvard University, Primate Research Center, Southborough, MA (Currently lab space shared 1000 sq feet)
 1990- Post-doctoral Research Advisor for Residents in Neurology and Neurosurgery, MGH.
 Post-doctoral Research Advisor for Fellows in Neurobiology and Neurology, HMS.
 Faculty, Program of Neuroscience, Harvard Medical School.
 Senior Thesis Advisor, Harvard University, in Departments of Biochemistry, Biology and Psychology.
 Graduate Admission Committee, Program of Neuroscience, Harvard Medical School.
 Faculty, Neurobiology of Behavior course/program, McLean Hospital, Harvard Medical School
 Faculty, Lecturer, RUNN Course (Review and Update in Neurobiology for Neurosurgeons and Neurologists) Woods Hole, MA
 Faculty, Lecturer, Cold Spring Harbor Course: "Molecular Genetic Analysis of Diseases of the Nervous System"
 1992- Assoc. Professor of Neurology, Program of Neuroscience, Harvard Medical School, Boston, MA
 1992 Course organizer: HMS Program of Neuroscience Graduate Course; "Paradigms to investigate neuronal health: what happens to neurons in neurodegenerative diseases".
 1992 Faculty, Lecturer, Dept. of Neurology, HMS, MGH course: "Intensive Clinical and Basic

- Neuroscience Update", Boston.
 1994 Massachusetts General Hospital, Scientific Integrity Course (faculty)
 1995- McLean Hospital, Clinical Neuroscience Training Program (faculty)

Teaching and administrative experience (continued)

- 1995 Organizer, "Cellular and Molecular Treatments of Neurological Diseases" Scientific Conference, Cambridge, MA
 1996 Gene Therapy: Principles and Practice (Genetics 208), Harvard Medical School "Strategies of gene therapy for dominant and recessive genetic, as well as non-hereditary, diseases" (lecture)
 1996 Neurobiology of Disease Course, Harvard Medical School
 1998 Co-director, "Anatomy and Physiology of Basal Ganglia Surgery" CME Course and Scientific Conference, Sarasota, FL
 1998 Organizer, Second "Cellular and Molecular Treatments of Neurological Diseases" CME Course and Scientific Conference, Cambridge, MA
 1999 Co-director, Second "Anatomy and Physiology of Basal Ganglia Surgery" CME Course and Scientific Conference, Sarasota, FL
 1999- Center Director, NIH Udall Parkinson's Disease Research Center
 2001 Princeton, NJ, Intl. Neurodegeneration Conference (lecture)
 2001 Detroit, MI, Wayne State University Center for Molecular Medicine and Genetics Program in Neuroscience (annual speaker)
 2001 France, INSERM Workshop "Neural stem cells" (faculty)
 2001 Amsterdam, 22nd Intl. Summer School, "Plasticity in the Adult Brain" (faculty)
 2002 Organizer, Third "Cellular and Molecular Treatments of Neurological Diseases" Scientific Conference, Cambridge, MA

Memberships

International Brain Research Organization (IBRO)
 American Association for the Advancement of Science (AAAS)
 Society for Neuroscience
 European Neuroscience Association (ENA)
 Boston Society of Neurology and Psychiatry
 Huntington's Disease Society of America, Massachusetts Chapter
 American Society for Experimental Neuropathology
 World Federation of Neurology Huntington's Disease Research Group
 American Society for Neural Transplantation and Repair (ASNTR)
 International Society of Neuropathology
 New York Academy of Science (NYAS)
 American Academy of Neurology (AAN)
 International Society for Cell Transplantation
 American Society of Transplantation (AST)
 The Movement Disorders Society

Editorial Boards

Cell Transplantation
 J. Neural Transplantation and Plasticity
 J. Restorative Neurology and Neuroscience
 Experimental Neurology
 European Journal of Neuroscience

Receiving Editor

European Journal of Neuroscience

Membership on Advisory Committees

- 1992- Veterans Administration Merit Review Board, USA
- 1992- Internal Review Committee NIH Program Project grants
- 1993- *Ad hoc* member; Special Review Committees; National Institutes of Health (NINDS): Program Projects (Site-visit teams) and Clinical Research Centers (NIH)
- 1994- *Ad hoc* member, Neurological Disorders Program Project Review B Committee (NINDS)
- 1994- Council Member of American Society for Neural Transplantation (ASNT), Co-Chairman of Program Committee ASNT
- 1995-1996 Secretary of ASNT, Chairman of Program Committee, ASNT
- 1995 Advisory presentation before the US Senate Special Committee on Aging and before the US House Commerce Committee, Health and Environment Subcommittee
- 1997 Chairman, Advisory committee on Parkinson's disease for presentation to the U.S. Veterans Administration
- 1998-1999 President of American Society for Neural Transplantation and Repair (ASNTR)
- 1998-2001 Member, MDCN-2 Study Section
- 1998- Council, International Cell Transplant Society
- 1999 Program Committee, International Neural Transplantation and Repair
- 2001 Program Committee, New York Academy of Sciences, Parkinson's Disease Conference
- 2001- ALS Association, Scientific Review Committee

**PUBLICATIONS: (205) A. Original articles (120), B. Review articles and chapters (82),
C. Books and Editing (3)**

A. ORIGINAL ARTICLES

- O1. Isacson, O., Brundin, P., Kelly, P.A.T., Gage, F.H. and Björklund, A. (1984) Functional neuronal replacement by grafted striatal neurons in the ibotenic acid lesioned rat striatum. *Nature* 311, 458-460.
- O2. Gage, F.H., Dunnett, S.B., Brundin, P., Isacson, O. and Björklund, A. (1984) Intracerebral grafting of embryonic neural cells into the adult host brain: an overview of the cell suspension method and its application. *J. Dev. Neuroscience* 6, 137-151.
- O3. Brundin, P., Isacson, O. and Björklund, A. (1985) Monitoring of cell viability in suspensions of embryonic CNS tissue and its use as a criterion for intracerebral graft survival. *Brain Res* 331, 251-259.
- O4. Isacson, O., Brundin, P., Gage, F.H. and Björklund, A. (1985) Neural grafting in a rat model of Huntington's disease: Progressive neurochemical changes after neostriatal ibotenate lesions and striatal tissue grafting. *Neuroscience* 16, 799-817.
- O5. Gage, F.H., Brundin, P., Isacson, O. and Björklund, A. (1985) Rat fetal brain tissue survive and innervate host brain following five day pregraft tissue storage. *Neuroscience Lett.* 60, 133-137.
- O6. Brundin, P., Barbin, G., Isacson, O., Mallat, M., Chamak, B., Prochiantz, A., Gage, F.H. and Björklund, A. (1985) Survival of intracerebrally grafted rat dopamine neurons previously cultured in vitro. *Neuroscience Lett.* 61, 79-84.
- O7. Zetterström, T., Brundin, P., Gage, F.H., Sharp, T., Isacson, O., Dunnett, S.B., Ungerstedt, U. and Björklund, A. (1986) In vivo measurement of spontaneous release and metabolism of dopamine from intrastriatal nigral grafts using intracerebral dialysis. *Brain Res* 362, 344-349.
- O8. Isacson, O., Dunnett, S.B. and Björklund, A. (1986) Behavioural recovery in an animal model of Huntington's disease. *Proc. Natl. Acad. Sci. USA* 83, 2728-2732.
- O9. Brundin, P., Isacson, O., Gage, F.H. and Björklund, A. (1986) Intrastriatal grafting of dopamine-containing neuronal cell suspensions: effects of mixing with target or non-target cells. *Dev. Brain Res.* 24, 77-84.
- O10. Brundin, P., Isacson, O., Gage, F.H., Prochiantz, A. and Björklund, A. (1986) The rotating 6-hydroxydopamine

- lesioned mouse as a model for assessing functional effects of neuronal grafting. *Brain Res.* 366, 346-349.
- O11. Sofroniew, M.V., Isacson, O. and Björklund, A. (1986) Cortical grafts prevent atrophy of cholinergic basal nucleus neurons induced by excitotoxic cortical damage. *Brain Res.* 378, 409-415.
- O12. Sofroniew, M.V., Pearson, R.C.A., Isacson, O and Björklund, A. (1986) Experimental studies on the induction and prevention of retrograde degeneration of basal forebrain cholinergic neuron. *Prog. Brain Res* 70, 363-389.

ORIGINAL ARTICLES (120)

- O13. Pritzel, M., Isacson, O., Brundin, P., Wiklund, L. and Björklund, A. (1986) Afferent and efferent connections of striatal grafts implanted into the ibotenic acid lesioned neostriatum in adults rats *Exp. Brain Res.* 65, 112-126.
- O14. Dunnett, S.B., Whishaw, I.Q., Jones, G.H. and Isacson, O. (1986) Effects of dopamine-rich grafts on conditioned rotation in rats with unilateral 6-hydroxydopamine lesions. *Neurosci. Lett.* 68, 127-133.
- O15. Isacson, O., Dawbarn, D., Brundin, P., Gage, F.H., Emson, P.C. and Björklund, A. (1987) Neural grafting in a rat model of Huntington's disease: Striosomal organization as revealed by immunocytochemistry, acetylcholinesterase histochemistry, and receptor autoradiography. *Neuroscience* 22, 481-497.
- O16. Isacson, O., Fischer, W., Wictorin, K., Dawbarn, D. and Björklund, A. (1987) Astroglial response in the excitotoxically lesioned neostriatum and its projection areas. *Neuroscience* 20, 1043-1056.
- O17. Peschanski M. and Isacson O. (1988) Fetal homotypic transplants in the excitotoxically neuron depleted thalamus I: Light microscopy. *J. Comp. Neurol.* 274, 449-463.
- O18. Clarke D.J., Dunnett S.B., Isacson O., Sirinathsinghji D.J.S. and Björklund A. (1988) Striatal grafts in rats with unilateral striatal lesions I: Ultrastructural evidence of afferent synaptic inputs from the host nigrostriatal pathway. *Neuroscience* 24, 791-801.
- O19. Sirinathsinghji D.J.S, Dunnett S.B., Isacson O., Clarke D.J. and Björklund A. (1988) Striatal grafts in rats with unilateral neostriatal lesions II: In vivo monitoring of GABA release in the globus pallidus and substantia nigra. *Neuroscience* 24, 803-811.
- O20. Dunnett S.B., Isacson O., Clarke D.J. and Björklund A. (1988) Striatal grafts in rats with unilateral striatal lesions III: recovery from dopamine dependent motor asymmetry and deficits in skilled paw reaching. *Neuroscience* 24, 813-820.
- O21. Brundin P., Barbin G., Strecker R.E., Isacson O., Prochiantz A. and Björklund A. (1988) Survival and function of dissociated rat dopamine neurones grafted at different developmental stages or after being cultured in vitro. *Dev Brain Res* 39, 233-243.
- O22. Peschanski M., Rudin M., Isacson O., Delepiere M. and Roques B. (1988) Magnetic resonance imaging of intracerebral neural grafts. *Prog. Brain Res.* 78, 619-625.
- O23. Isacson O., Wictorin K., Fischer W., Sofroniew M. and Björklund A. (1988) Fetal cortical suspension grafts to the excitotoxically lesioned neocortex: anatomical and neurochemical studies of trophic interactions. *Prog. Brain Res.* 78, 13-27.
- O24. Fischer W., Wictorin K., Isacson O. and Björklund A. (1988) Trophic effects on cholinergic striatal interneurons by submaxillary gland transplants. *Prog. Brain Res.* 78, 409-413.
- O25. Wictorin, K., Isacson, O., Fischer W., Nothias F., Peschanski M. and Björklund A. (1988) Connectivity of striatal grafts implanted into the ibotenic acid-lesioned striatum I: subcortical afferents. *Neuroscience* 27, 547-562.
- O26. Nothias F., Wictorin K., Isacson O., Björklund A. and M. Peschanski (1988) Morphological alteration of thalamic afferents in the excitotoxically lesioned striatum. *Brain Res.* 461, 349-354.
- O27. Lams B.E., Isacson O. and Sofroniew M.V. (1988) Loss of transmitter-associated staining following axotomy does not indicate death of brainstem cholinergic neurons. *Brain Res.* 475, 401-406.
- O28. Sofroniew, M.V. and Isacson, O. (1988) Distribution of degeneration of cholinergic neurons in the septum following axotomy in different portions of the fimbria fornix: a correlation between the degree of cell loss and the proximity of neuronal somata to the lesion. *J. Chem. Neuroanatomy* 1, 327-337.
- O29. Sofroniew M.V., Isacson O. and O'Brien T.S. (1989) Nerve growth factor receptor immunoreactivity in the rat suprachiasmatic nucleus. *Brain Res.* 476, 358-362.
- O30. Wictorin, K., Simerly, R.B., Isacson, O., Swanson, L.W. and Björklund A. (1989) Connectivity of striatal grafts

implanted into the ibotenic acid lesioned striatum II: efferent projecting graft neurons and their relationship to host afferents within the grafts. *Neuroscience* 30, 313-330.

- O31. Isacson O., Riche D., Hantraye Ph, Sofroniew M.V. and Maziere M. (1989) A primate model of Huntington's disease: cross-species implantation of striatal precursor cells to the excitotoxically lesioned baboon caudate-putamen. *Exp. Brain Res.* 75, 213-220.
- O32. Dusart, I., Isacson, O., Nothias, F., Gumpel, M. and Peschanski, M. (1989) Schwann cells migrate into CNS excitotoxic lesions. *Neurosci. Lett.* 105, 246-250.

ORIGINAL ARTICLES (120)

- O33. O'Brien T.S., Svendsen C.N., Isacson O. and Sofroniew M. (1990) Loss of true blue labelling from the medial septum following transection of the fimbria-fornix; evidence for the death of cholinergic and non-cholinergic neurons. *Brain Res.* 508:249-56.
- O34. Isacson, O., Hantraye P., Maziere M., Sofroniew M.V. and Riche D. (1990) Apomorphine-induced dyskinesias after excitotoxic caudate-putamen lesions and the effects of neural transplantation in non-human primates *Prog. Brain Res.* 82, 523-533.
- O35. Hantraye Ph., Riche D., Maziere M. and Isacson O. (1990) An experimental primate model for Huntington's disease: anatomical and behavioural studies of unilateral excitotoxic lesions of the caudate-putamen in the baboon. *Exp. Neurol.* 108, 91-104.
- O36. Sofroniew M.V., Galletly N.P., Isacson O. and Svendsen C.N. (1990) Adult basal forebrain neurons do not require target neurons for survival. *Science* 247, 338-342.
- O37. Denys, A., Leroy-Willig, A., Hantraye, P., Riche, D., Isacson, O., Maziere, M. and Syrota, A. (1991) *In Vivo* MRI of neural transplants in a primate model of Huntington's disease. *Amer. J. of Roent.* 158, 215-216.
- O38. Schumacher, J.M., Short, M.P., Hyman, B.T., Breakefield, X.O., and Isacson, O. (1991). Intracerebral Implantation of Nerve Growth Factor-Producing Fibroblasts Protects Striatum Against Neurotoxic Levels of Excitatory Amino Acids. *Neuroscience* 45, 561-570.
- O39. Levisohn, A. and Isacson, O. (1991) Excitotoxic lesions of the rat entorhinal cortex. Effects of selective neuronal damage on acquisition and retention of a non-spatial reference memory task. *Brain Res.* 564, 230-244.
- O40. Isacson, O. and Peschanski, M. (1992) Is There Capacity for Anatomical and Functional Repair In The Adult Somatosensory Thalamus? *Exp. Neurology* 115, 173-176.
- O41. Hantraye, P., Loc'h, C., Maziere, B., Khalili-Varasteh, M. Crouzel, C., Fournier, D., Yorke, J-C., Stulzaf, O., Riche, D., Isacson, O., Maziere, M., (1992) 6-[¹⁸F] Fluoro-L-Dopa uptake and [⁷⁶Br] bromolisuride binding in the excitotoxically lesioned caudate-putamen of nonhuman primates studied using positron emission tomography. *Exp. Neurol.* 115, 218-227.
- O42. Hantraye, P., Riche, D., Maziere, M. and Isacson, O. (1992) Intrastratial Grafting of Cross-Species Fetal Striatal Cells Reduces Abnormal Movements in a Primate Model of Huntington's Disease. *Proc. Natl. Acad. Sci. (USA)* 89, 4187-4191.
- O43. Isacson, O. and Sofroniew, M.V. (1992) Neuronal loss or replacement in the injured adult cerebral neocortex induce extensive remodeling of intrinsic and afferent neural systems. *Exp. Neurol.* 117, 151-175.
- O44. Hantraye, P., Brownell, A.-L., Elmaleh, D., Spealman, R.D., Wullner, U., Brownell, G.L., Madras, B.K. and Isacson, O. (1992) Dopamine fiber detection by ¹¹C-CFT and PET in a primate model of Parkinsonism. *NeuroReport* 3, 265-268.
- O45. Schumacher, J.M., Hantraye, P., Brownell, A-L, Riche, D., Madras, B.K., Davenport, P.D., Maziere, M., Elmaleh, D.R., Brownell, G.L. and Isacson, O. (1992) A primate model of Huntington's disease: functional neural transplantation and CT-guided stereotactic procedures. *Cell Trans.* 1, 313-322.
- O46. Rosenberg, W.S., Breakefield, X.O., DeAntonio, C. and Isacson, O. (1992) Authentic and artifactual detection of the E. coli lacZ gene product in the rat brain by histochemical methods. *Mol. Brain Res.* 16, 311-315.
- O47. Beal, M.F., Swartz, K.J. and Isacson, O. (1992) Developmental changes in brain kynurenic acid concentrations. *Dev. Brain Res.* 68, 136-139.
- O48. Hantraye, P., Leroy-Willig, A., Denys, A., Riche, D., Isacson, O., Maziere, M. and Syrota A. (1992) Magnetic

resonance imaging to monitor pathology of caudate-putamen after excitotoxin-induced neuronal loss in the non-human primate brain. *Exp. Neurol.* 118,18-23.

- O49. Frim, D.M., Short, M.P., Rosenberg, W.S., Simpson, J., Breakefield, X.O. and Isacson, O. (1993) Nerve growth factor-secreting fibroblasts protect only locally against excitotoxic lesions in the rat striatum. *J. Neurosurg.* 78, 267-273.
- O50. Yee, W.M., Frim, D.M. and Isacson, O. (1993) Relationships between stress protein induction and NMDA-mediated neuronal death in the entorhinal cortex. *Exp. Brain Res.* 94, 193-202.
- O51. Simpson, J.R. and Isacson, O. (1993) Mitochondrial impairment reduces the threshold for in vivo NMDA-mediated neuronal death in the striatum. *Exp. Neurol.* 121, 57-64.

ORIGINAL ARTICLES (120)

- O52. Frim, D.M., Simpson, J., Uhler, T., Short, M.P., Bossi, S.R., Breakefield, X.O. and Isacson, O. (1993) Striatal degeneration induced by mitochondrial blockade is prevented by biologically delivered NGF. *J. of Neurosci. Res.* 35, 452-458.
- O53. Bossi, S.R., Simpson, J.R., Isacson, O. (1993) Age dependence of striatal neuronal death caused by mitochondrial dysfunction. *NeuroReport* 4, 73-76.
- O54. Frim, D.M., Short, M.P., Breakefield, X.O. Isacson, O. (1993) Biological gene-product delivery to the brain: a protocol for retroviral gene transfer into cultured cells and intracerebral transplantation. *NeuroProtocol* 3, 63-68.
- O55. Frim, D.M., Uhler, T.A., Short, M.P., Ezzedine, Z.D., Klagsbrun, M., Breakefield, X.O. and Isacson, O. (1993) Effects of biologically delivered NGF, BDNF, and bFGF on striatal excitotoxic lesions. *NeuroReport* 4, 367-370.
- O56. Frim, D.M., Yee, W.M., Isacson, O. (1993) NGF reduces striatal excitotoxic neuronal loss without affecting concurrent neuronal stress. *NeuroReport* 4, 655-658.
- O57. Wullner, U., Brouillet, E., Isacson, O., Young, A.B. and Penney, J.B. (1993) Glutamate receptor binding sites change in MPTP-treated mice. *Exp. Neurol.* 121, 284-287.
- O58. Burns, L.H., Sato, K., Wullner, U. and Isacson, O. (1993) Intra-nigra infusion of AMPA attenuates dopamine-dependent rotation in the rat. *NeuroReport* 4, 1075-1078.
- O59. Pakzaban, P., Deacon, T., Burns, L., Isacson, O. (1993) Increased proportion of AChE-rich zones and improved morphologic integration in host striatum of fetal grafts derived from the lateral but not the medial ganglionic eminence. *Exp. Brain Res.* 97, 13-22.
- O60. Uhler, T.A., Frim, D.M., Pakzaban, P. and Isacson, O. (1994) The effects of mega-dose methylprednicolone and U-78517F on glutamate-receptor mediated toxicity in the rat neostriatum. *Neurosurgery* 34, 122-128.
- O61. Brownell, A.L., Hantraye, P., Wullner, U., Hamberg, L., Shoup, T., Elmaleh, D.R., Madras, B., Frim, D.M., Brownell, G.L., Rosen, B.R. and Isacson, O. (1994) *In vivo* glucose utilization, dopamine receptor binding and striatal hemodynamics in a primate model of Huntington's disease. *Exp. Neurol.* 125, 41-51.
- O62. Andersen, J.K., Frim, D.M., Isacson, O. and Breakefield, X.O. (1994) Herpes-virus mediated gene delivery into the rat brain: specificity and efficiency of the neuron-specific enolase promoter. *Cell. & Mol. Neurobiol.* 13, 503-515.
- O63. Davar, G., Kramer, M.F., Garber, D., Roca, A.L., Andersen, J.K., Bebrin, W., Coen, D.M., Kosz-Vnenchak, M., Knipe, D.M., Breakefield, X.O. and Isacson, O. (1994) Comparative efficacy of gene delivery to mouse sensory neurons using herpes virus vectors. *J. Comp. Neurol.* 339, 3-11.
- O64. Wullner, U., Hantraye, P., Brownell, A.-L., Pakzaban, P., Burns, L., Shoup, T., Elmaleh, D., Petto, A., Spealman, R.D., Brownell, G.L. and Isacson, O. (1994) Dopamine terminal loss and onset of motor symptoms in MPTP-treated monkeys: a positron emission tomography study with ¹¹C-CFT. *Exp. Neurol.* 126, 305-309.
- O65. Frim, D.M., Uhler, T.A., Galpern, W., Beal, M.F., Breakefield, X.O. and Isacson, O. (1994) Implanted fibroblasts genetically engineered to produce brain-derived neurotrophic factor prevent 1-methyl-4-phenylpyridinium toxicity to dopaminergic neurons in the rat. *Proc. Natl. Acad. Sci. USA* 91, 5104-5108.
- O66. Andersen, J.K., Frim, D.M., Isacson, O. and Breakefield, X.O. (1994) Catecholaminergic cell atrophy in a transgenic mouse aberrantly overexpressing MAO-B in neurons. *Neurodegeneration* 3, 97-109.
- O67. Frim, D.M., Wullner, U., Beal, M.F. and Isacson, O. (1994) Neuroprotection of rat striatum: cellular delivery of NGF induces catalase and modifies ATP levels but not glutamate receptor binding or NMDA receptor

expression. *Exp. Neurol.* 128, 172-180.

- O68. Pakzaban, P., Geller, A. and Isacson, O. (1994) Effect of exogenous nerve growth factor on neurotoxicity of and neuronal gene delivery by a herpes simplex amplicon in the rat brain. *Human Gene Therapy* 5, 987-995.
- O69. Andersen, J.K., Frim, D.M., Isacson, O., Beal, M.F., Breakefield, X.O. (1994) Elevation of neuronal MAO-B activity in a transgenic mouse model does not increase sensitivity to the neurotoxin 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP). *Brain Res.* 656, 108-114.
- O70. Deacon, T.W., Pakzaban, P., Burns, L.H., Dinsmore, J. and Isacson, O. (1994) Cytoarchitectonic development, axon-glia relationships and long distance axon growth of porcine striatal xenografts in rats. *Exp. Neurol.* 130, 151-167.
- O71. Deacon, T.W., Pakzaban, P. and Isacson, O. (1994) The lateral ganglionic eminence is the source of striatal phenotypes: neural transplantation and developmental evidence. *Brain Res.* 668, 211-219.

ORIGINAL ARTICLES (120)

- O72. Burns, L.H., Pakzaban, P., Deacon, T.W., Brownell, A-L., Tatter, S.B., Jenkins, B.G. and Isacson, O. (1994) Selective putaminal excitotoxic lesions in non-human primates model the movement disorder of Huntington disease. *Neuroscience* 64, 1007-1017.
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- R61. Isacson O, Kang, UJ. The Potential of Gene Therapy for Treatment of Parkinson's Disease. In: Principles of Surgery for Parkinson's Disease and Movement Disorders, Krauss, K., Jankovic, J., Grossman, R. eds. Lippincott-Raven, 1999:in press.
- R62. Isacson O. (Discussant) Novartis Foundation Symposium, J. Goode, ed., 1999:in press.
- R63. Costantini LC, Bakowska JC, Breakfield XO, Isacson O. Gene Therapy in the CNS. *Gene Therapy* 2000;7:93-109.
- R64. Isacson O. Book Review: "Neural Transplantation" by William J. Freed *Nature Medicine* 2000;6:621.
- R65. Kordower JH, Isacson O, Leventhal L, Emerich DF. Cellular delivery of trophic factors for the treatment of Huntington's disease: is neuroprotection possible? *Progress in Brain Research* 2000;127:413-30.
- R66. Isacson O, Costantini L, Schumacher JM, Cicchetti F, Chung S, Kim K-S. Cell Implantation Therapies for Parkinson's Disease Using Neural Stem, Transgenic or Xenogenic Donor Cells. *Parkinson's Disease and Related Disorders*, Elsevier Science Ltd. 2001;7:205-12.
- R67. Isacson O, van Horne C, Schumacher JM, Brownell A-L. Improved surgical cell therapy in Parkinson's disease: physiological basis and new transplantation methodology. In: *Parkinson's Disease, Advances in Neurology*, D. Calne, ed. Lippincott Williams Wilkins, Philadelphia, PA, 2001;86:447-54.

REVIEW ARTICLES AND BOOK CHAPTERS (82)

- R68. Emilien G, Ponchon M, Caldas C, Isacson O, Maloteaux M. Impact of genomics on drug discovery and clinical medicine. *Quarterly Journal of Medicine (UK)*. 2000;93:391-423.
- R69. Isacson O, Lin L. Cholinergic modulation of amyloid processing and dementia in animal models of Alzheimer's disease. *Annals of the New York Acad Sci* 2000;920:309-14.
- R70. Björklund L, Herlihy D, Isacson O. Cell and synaptic replacement therapy for Parkinson's disease: current status and future directions. *Neuroscience News* 2000;6:6-12.
- R71. Isacson O. Making regeneration and cell therapy possible for neurological disease. *Neuroscience News* 2000;6:4-5.
- R72. Isacson O, Björklund L, Sanchez Pernaute R. The need for more research on "neural transplantation" for Parkinson's disease. *Nature Neurosci* 2001;4:553.
- R73. McNaught K SP, Olanow CW, Halliwell B, Isacson O, Jenner P. Failure of the ubiquitin-proteasome system: a unifying hypothesis for the cause of Parkinson's disease. *Nat Rev Neurosci* 2001;2:589-94.
- R74. Williams-Johnson, M, Isacson O. Parkinson's disease, environment and genes: Therapeutic approaches, Session XI summary and research needs. *Neurotoxicology* 2001;22:855-8.
- R75. Costantini LC, Fraefel C, Breakfield XO, Isacson O. Herpes simplex virus/adeno-associated virus hybrid vectors for gene transfer to neurons. Ed Jeffrey R. Morgan *Methods in Molecular Medicine, Gene Therapy Protocols* 2nd Ed, 2001;461-479.
- R76. Isacson O, Seo H, Lin L, Albeck D, Granholm A-C. Alzheimer's disease and Down's syndrome: roles of APP, trophic factors and ACh. *Trends in Neuroscience* 2001;25:79-84.
- R77. Isacson O. Models of repair for future treatment modalities of Parkinson's disease. *Brain Research Bulletin*, in press.
- R78. Brownell A-L, Eidelberg D, Isacson O. Brain imaging as a diagnostic tool. *Encyclopedia of Life Sciences*, March 2002 www.els.net
- R79. Björklund L, Isacson O. Regulation of dopamine cell type and transmitter function in fetal and stem cell transplantation for Parkinson's disease. *Progress in Brain Research*, 138, 411-420.
- R80. Pernaute RS, Brownell A-L, Isacson O. Functional imaging of the dopamine system: in vivo evaluation of dopamine deficiency and restoration *Neurotoxicology*, 23, 469-478.
- R81. Isacson O, Björklund L.M. and Schumacher, J.M. Towards full restoration of synaptic and terminal function of the dopaminergic system in Parkinson's disease from regeneration and neuronal replacement by stem cells. *Annals of Neurology*, in press.

- R82. Costantini, L.C. and Isacson, O. (2002) Immunophilin ligands and dopamine neurons: Specific effects in culture and in vivo. In: Immunosuppressant Analogs in Neuroprotection, pp. 49-66.

C. BOOKS AND EDITING (3)

1. Isacson O. Neural grafting in an animal model of Huntington's disease. Lund, Sweden: Lund University Library, 1987:1-188 (ISBN 91-7900-258-7).
2. Sanberg P, Wictorin K, Isacson O. Cell Transplantation for Huntington's Disease. Austin: R.G. Landes & Co, 1994 (ISBN 0-89603-944-7).
3. Immunosuppressant Analogs in Neuroprotection. Borlongan CV, Isacson O, Sanberg PR, eds. The Humana Press, Totowa, NJ, 2002 (ISBN 1-59259-315-1).

RESEARCH LECTURES AND INVITATIONS AS SPEAKER:

1. Hamburg (1983) at European Neuroscience Association "Monitoring of neuronal survival in suspensions of embryonic CNS tissue" (paper)
2. Cambridge (1984) at University of Cambridge, Downing Site "Functional neuronal replacement in the ibotenic acid lesioned neostriatum by neostriatal neural grafts" (lecture)
3. Lund (1984) at Nordic Meeting in Neuropsychiatry "Functional neuronal replacement in an animal model of Huntington's disease" (paper)

RESEARCH LECTURES AND INVITATIONS AS SPEAKER (continued)

4. Oxford (1984) at Dept. of Pharmacology, University of Oxford "Striatal neural transplant in the excitotoxically lesioned neostriatum" (lecture)
5. Uppsala (1985) at Nordic Physiology Meeting "Neuronal replacement in an animal model of Huntington's disease" (paper)
6. Munchen (1985) at Glial-neuronal communication symposia "The use of neural transplants in the study of lesion models of the adult CNS" (lecture)
7. Oxford (1985) at European Neuroscience Association "Morphological and behavioural changes following neural grafting in rats with lesions of the anteromedial neostriatum" (paper)
8. Avoriaz (1986) Symposium at European Winter Congress on Brain Research "Neural replacement by intracerebral grafts in animal models of Parkinson's and Huntington's disease" (chairman and lecture)
9. New York (1986) at New York Academy of Sciences "Morphology and function of striatal neural grafts" (lecture)
10. Dusseldorf (1986) at Dept. of Neurology "The use of neural grafting in studies of CNS development and regeneration" (lecture)
11. Spetses-ETP (1986) Research program at European Training Program "Autumn School" "The use of neural grafting in experimental studies of CNS regeneration and development" (lecturer)
12. London (1987) at the Royal Free Hospital, Dept. of Psychiatry "Aspects of degeneration and regeneration in the adult CNS using intracerebral transplants" (lecture)
13. London (1987) at Maudsley Hospital, Inst. of Psychiatry "Neural grafting in animal models of neurodegenerative disease" (lecture)
14. Venice (1987) at the 2nd Symposium on Restorative Neurology "The use of fetal neurons to replace neurons in the CNS" (lecture)
15. Rochester, New York (1987) at Neural transplantation into the mammalian CNS meeting "Fetal cortical grafts into the excitotoxically lesioned neocortex: a model for trophic interactions in Alzheimer's disease?" (paper)
16. Pécs, Hungary (1987) at Satellite Symposium on Neural Regeneration and Transplantation "Striatal cell suspension grafts in an animal model of Huntington's disease" (paper)
17. Paris (1987) at Dept of Neurology, Frédéric Joliot Hospital, Orsay "A primate model of Huntington's disease"
18. Boston (1988) at Dept. of Neurology, Harvard Medical School, Massachusetts General Hospital "Neuronal Transplantation and strategies for CNS regeneration" (seminar)

19. Paris (1988) at Dept. of Neurology, Frederic Joliot Hospital, Orsay "Excitotoxic lesions models of CNS degeneration" (lecture)
20. Paris (1988) at Dept. of Neurology, Frederic Joliot Hospital, Orsay "The use of neural transplantation in patients with neurodegenerative disease: basic research and recent clinical experiments"
21. Lyon (1988) conference; Trends in Neurobiology "Neuron-target interaction in the CNS: neuronal degeneration and regeneration theories" (paper)
22. Cambridge, England (1989) Neural transplantation meeting: molecular bases to clinical application "Neural transplantation in a primate model of Huntington's disease" (paper)
23. Lund, Sweden (1990) From pharmacological to neuronal replacement in Huntington's disease (paper)
24. Boston, MA (1990) Excitotoxic lesions of the cerebral cortex model degeneration and plasticity seen in neurodegenerative diseases (lecture)
25. Cold Spring Harbor, N.Y. (1990) The use of genetically engineered cells as donor tissue in models of intracerebral transplantation (lecture)
26. Woods Hole Marine Biology Laboratory (1990) RUNN course lecture: Studies of neuronal cell death and regeneration in transplantation models" (faculty)
27. St. Louis, Missouri (1991) CNS Transplants in Adult Damaged Sensory Thalamus and Neocortex (lecture)
28. Washington, D.C. (1991) at Georgetown University, Neural Transplantation in Animal Models of Huntington's Disease (lecture)
29. Paris (1991) at La Salpetriere Hospital, "Animal Models of Neuronal Protection, Degeneration and Regeneration: Concepts of Neuronal Health" (lecture)
30. Stockholm (1991) at Karolinska Institute, "CNS degeneration and regeneration models: new concepts of neuronal damage and protection" (lecture)

RESEARCH LECTURES AND INVITATIONS AS SPEAKER (continued)

31. Nagoya, Japan (1992) at "International Conference on Biochemistry of Disease" (lecture)
32. Washington (1992) at "IV International Symposium on Neural Transplantation" (lecture)
33. Brussels (1992) at "25th International Congress of Psychology" (lecture)
34. Frankfurt (1993) Symposium on anti-excitotoxic therapy: *Neuronal protection, gene-transfer and circuitry repair in the basal ganglia* (lecture)
35. Hancock, MA (1994) at Third Berkshire Neuroscience Symposium (lecture)
36. Chatenay-Malabry (Paris) (1994) at 5th International Symposium on Neural Transplantation (lecture)
37. Woods Hole, MA (1994) at RUNN Course "Affecting Neural Function by Transplantation" (faculty)
38. Paris (1995) at ANPP Meeting "Novel Therapeutics in the Nervous System: Gene Transfers and Trophic Factors" (lecture)
39. Chicago, IL (1995) for Rush University Research Week (Keynote speaker)
40. National Press Club, Washington D.C. (1995). New therapies for Parkinson's disease (lecture)
41. U.S. Senate Special Committee on Aging, Washington D.C. (1995). Advisory presentation on Parkinson's disease
42. House Subcommittee on Health and Environment, Washington, D.C. (1995) Advisory presentation on Parkinson's disease
43. Maastricht, Holland (1995) Annual Meeting of NECTAR (lecture)
44. San Francisco, CA (1996) Annual Meeting of American Diabetes Association (Keynote speaker)
45. Miami, FL (1996) University of Miami, "Project to Cure Paralysis" (Visiting Professor)
46. New York, NY (1996) New York Academy of Sciences (lecture)
47. U.S. Veterans Administration, Washington, D.C. (1997) Advisory presentation on Parkinson's disease
Chairman, Advisory Committee on Parkinson's disease research
48. Vienna, Austria (1998) Austrian Parkinson Society, Vienna, "Reconnections of neural circuitry in Parkinson's disease patients by xenogeneic dopaminergic neurons." (lecture)
49. New York, NY (1998) 5th Intl. Congress of Parkinson's Disease and Movement Disorders. "Gene Therapy for Parkinson's Disease", (plenary lecture)
50. Tokyo, Japan (1998) The Molecular Medicine Revolution Conference, "Neural cell transplants to physiologically

- repair circuitry in neurodegenerative disease" (lecture).
51. Cardiff, Wales (1998) The Physiological Society, "Cell transplantation as a therapy for Parkinson's disease" (lecture)
 52. New York, NY (1999) Cornell Medical School/New York Hospital "Developing nerve cells against neurodegeneration" (grand rounds & lecture)
 53. Montreux, Switzerland (1999) The Cell Transplant Society, "Primary neuronal cell transplantation for Parkinson's disease (lecture)
 54. Lake Tahoe, NV (1999) Keystone Symposia, "Neural xenotransplantation for neurodegenerative disease" (lecture)
 55. Halifax, Nova Scotia (1999) Dalhousie University, Clinical Neuroscience (rounds) and Dept. of Anatomy and Neurobiology (lecture)
 56. Pittsburgh, PA (1999) University of Pittsburgh Medical Center, Dept. of Pathology (lecture)
 57. Rochester, NY (1999) University of Rochester, Experimental Therapeutics Workshop (lecture) and Neurology Grand Rounds
 58. Vancouver, BC (1999) XIIIth Intl. Congress on Parkinson's Disease (lecture)
 59. Odense, Denmark (1999) 7th Intl. Neural Transplantation Meeting (lecture)
 60. Boston, MA (1999) European Behavioral Pharmacology Society and Behavioral Pharmacology Society Conference (lecture)
 61. Vienna (1999) Austrian Parkinson Society (lecture)
 62. Bonn (1999) Intl. Neuroscience Symposium "Molecular Basis of CNS Disorders" (lecture)
 63. London (1999) The Novartis Foundation "Neural Transplantation in Neurodegenerative Disease" (Discussant)
 64. Cambridge, MA (2000) MIT, Modulation of APP and memory by the cholinergic system (lecture)
 65. Boston, MA (2000) HMS, Harvard Medicine at the Millennium, "Parkinson's and Other Neurodegenerative Diseases: Bench to Bedside" (lecture and moderator)

RESEARCH LECTURES AND INVITATIONS AS SPEAKER (continued)

66. Louisville, "The Neuroscience of Developing Cell Therapies for Parkinson's Disease" (lecture)
67. Zurich, Intl. Study Group on the Pharmacology of Memory, (lecture)
68. Tokyo, Intl. Workshop: Stem Cell Biology & Cellular Molecular Treatment (lecture)
69. Il Ciocco, Italy, Gordon Research Conference (lecture)
70. Rome, Intl. Cong. of the Transplantation Society (plenary lecture)
71. Turin, Italy, Cellular & Molecular Mechanisms of Brain Repair (lecture)
72. Stockholm, Karolinska Institute, Neural Donor Cells for Transplantation (lecture)
73. Boston, MA (2001) Brigham and Women's Hospital, Neurosurgery Rounds
74. Boston, MA (2001) MGH, Neurosurgery Grand Rounds
75. Boston, MA (2001) Beth Israel, Neurology Grand Rounds
76. Boston, MA (2001) Children's Hospital, Neurosurgical Grand Rounds
77. Colorado, (2001) Winter Conf. on Brain Repair, Cell and Gene Therapy for Basal Ganglia Disorders (panel organizer)
78. San Francisco, CA (2001) AAAS, Stem Cell Biology and Parkinson's Disease (session lecture)
79. Paris, France (2001) Association pour la Neuro-Psycho-Pharmacologie, Huntington a Model Disease (lecture)
80. Valencia, Spain (2001) Fundacion Valenciana de Estudios Avanzados, The Impact of Stem Cell Research on Neural Transplantation (lecture)
81. Potomac, MD (2001) Workshop on Department of Defense Sponsored Parkinson's Related Research (Session Chair)
82. Philadelphia, PA (2001) World Parkinson's Day Symposium, Thomas Jefferson University (lecture)
83. Detroit, MI (2001) Wayne State University Center for Molecular Medicine and Genetics, Program in Neuroscience (annual speaker)
84. Halifax, NS, Canada (2001) Canadian Congress of Neurological Sciences (lecture)
85. Princeton, NJ (2001) Intl. Neurodegeneration Conference (lecture)

86. Colorado Springs, CO (2001) Intl. Neurotoxicology Meeting (lecture)
87. New York, NY (2001) Mount Sinai Medical Center (lecture)
88. Pavia, Italy (2001) Paoletti Lecture (plenary lecture)
89. Londe-les Maures, France (2001) Inserm Workshop nr 125 Neural Stem Cells (lecture)
90. Boston, MA (2002) Partners/HMS, Colloquium on Understanding Neurodegenerative Diseases
91. Abano Terme, Italy (2002) Symposium of the GlaxoSmithKline Neurology- GI Research
92. Symposia Series: Neuroregeneration: future of the brain (lecture)
93. Aspen, CO (2002) McKnight Conference on Neuroscience (workshop)
94. Bradford, PA (2002) HCNr Glendorn Retreat (lecture)
95. Charleston, SC (2002) Dept of Physiology and Neurosci., Med. U South Carolina (grand rounds)
96. Frauenchiemsee, Germany, Stem Cell Based Therapeutic Approaches for Parkinson's Disease (lecture)
97. Keystone, CO(2002) Neurodegeneration and Prospects for Neuroprotective and Restorative Therapies in PD (lecture)
98. Stockholm, Sweden (2002) Nordic Pharmaceutical Conference (lecture)
99. Tsukuba, Japan (2002) First Eisai Neurology Conference (special lecture)
100. Durham, NC (2002) Duke University (visiting professor)